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FOREIGN TECHNOLOGY DIVISION

LASER GLITTERING IN THE RELATIVELY STABLE PROPAGATION LAYER NEAR THE SEA SURFACE

By

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HUMAN TRANSLATION

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LASER GLITTERING IN THE RELATIVELY STABLE PROPAGATION LAYER NEAR THE SEA SURFACE

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In the fall and winter of 1979 and in mid-summer of 1980, the authors and colleagues conducted communication transmission experiments on the optical path (some experimental points were besides the wharves) and more than 95% of the complete optical path was above water at Tuan Island--Hung Island--Qingdao, Tuan Island to Xuejia Island and Qingdao to Dagong Island, by using 10.6 micrometer collimated light beams for the communication transmission experiments for distances of 4, 5, 7.8, 10 and 21 kilometers at heights of 8, 10, 16, 53 and 70 meters above the water. It was discovered that laser glittering near the water surface has a relatively weak property; however, the glittering at heights of 53 and 70 meters did not exhibit this property. This conclusion puts to rest the doubt that the range of heights lower than 40 meters from the sea surface is a forbidden zone for laser transmission, by proving that it is not a forbidden zone. This conclusion is helpful to progress in laser transmission between islands, thus lowering the capital costs, since higher investments are required for constructing communication points on mountain tops or on high buildings.

Furthermore, the article explains the above-mentioned phenomena from the viewpoint of the viscosity of water vapor and sea-atmosphere energy exchange.

MODEL WHITE SAMPLE CELL WITH TEN METER LONG MULTI-OPTICAL PATH LENGTH

Lin Yuanqi, Guo Zengxin, Wang Wanchun, and Han Jingcheng, No. 911 Research Group, Department of Physics, East China (Huadong) Normal University

To conduct studies on laser transmission and absorption experiments, the authors built an experimental prototype of a channel in 1970. The channel is a model White structure, constructed of stainless steel cylinders 10.5 m in overall length, 330 mm inside diameter, and 4 mm wall thickness; the channel is made up of five sections, sealed with vacuum type O rings between sections. The middle section is connected to a vacuum discharge system set (including a mechanical pump and a metal oil diffusion pump) and a gas distribution system. Various gas samples at any pressures can be pumped into the vessel; moreover, precision studies of optical measurements and simulated atmosphere can be conducted under controlled conditions.

Inside the sample vessel, the optical system is composed of three conjugate spherical surface reflective lenses. Through the control mechanism, the relative position of the three spherical surface lenses can be changed, thus making adjustments by changing the optical path length. Marking of the geometrical length of actual light paths is accomplished by observing the number of imaging points on the mirror surface of an He-Ne laser.

For each adjustment, the change in optical path is in multiples of 40 m. This sample vessel can be randomly adjusted within a range not in excess of 800 m of effective light path.

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